

PSG COLLEGE OF ARTS & SCIENCE
(AUTONOMOUS)

MSc DEGREE EXAMINATION DECEMBER 2022
(First Semester)

Branch – ENVIRONMENTAL SCIENCE

AIR POLLUTION & MANAGEMENT

Time: Three Hours

Maximum: 50 Marks

SECTION-A (5 Marks)

Answer ALL questions

ALL questions carry EQUAL marks (5 x 1 = 5)

1. Fanning plume will occur during _____ atmospheric condition.
i) Highly unstable ii) Moderately unstable
iii) Neutral iv) Inversion
2. Which of the following is the secondary pollutant in the troposphere?
i) O₃ ii) CO iii) NO iv) O₂
3. For air quality monitoring, the sampler must be placed _____ m above the ground Level.
i) 1-5 ii) 2-8 iii) 3-10 iv) 4-12
4. Combustion technique converts the air pollutants into
i) CO₂ and H₂O ii) CO and H₂O
iii) CO₂ and H₂O₂ iv) CO₃ and H₂O
5. The theoretical air fuel ratio for gasoline powered engine is _____
i) 0.147:1 ii) 1.47:1 iii) 14.7:1 iv) 147:1

SECTION - B (15 Marks)

Answer ALL Questions

ALL Questions Carry EQUAL Marks (5 x 3 = 15)

6. a) Explain the importance of wind roses.
OR
b) Explain the influence of Coriolis force on wind.
7. a) Discuss the effects of CO on human health.
OR
b) Briefly explain the formation of secondary particulates in the atmosphere.
8. a) List the conditions to be met at the air monitoring station.
OR
b) Explain quality assurance and quality control in air monitoring stations.
9. a) Differentiate between physical adsorption and chemical adsorption in control of gaseous contaminants.
OR
b) Discuss the advantages and disadvantages of fabric filters.
10. a) List the advantages of hybrid vehicles.
OR
b) Defend the importance of stoichiometric air fuel ratio in vehicles.

Cont...

SECTION -C (30 Marks)

Answer ALL questions

ALL questions carry EQUAL Marks

(5 x 6 = 30)

11. a) Relate the atmospheric stability conditions with coning plume and lofting Plume.
OR
b) Explain the vertical profile of atmosphere based on temperature with diagram.
12. a) Discuss the size distribution of particulates in the atmosphere.
OR
b) Explain green house effect and its impact on environment.
13. a) Determine L_{eq} for the following data: In an ambient environment, noise level of 90 dBA existed for 5 minutes and it was followed by 60 dBA for 50 minutes. Calculate the L_{eq} for the total duration of 55 minutes. Assume a 5 minutes sampling interval.
OR
b) Explain the steps involved in sampling of particulate matters.
14. a) Design an ESP to remove fly ash particles from stack gas flowing at $10 \text{ m}^3 \text{ s}^{-1}$. Drift velocity, ω was determined as $\omega = 3.0 \times 10^5 d_p \text{ m/s}$. Determine the plate area required to collect $0.5 \mu\text{m}$ particles with 90% efficiency.
OR
b) Explain the use of venturi scrubber in controlling particulates with diagram.
15. a) Explain Gaussian Plume Model for a point source of pollution.
OR
b) Analyze the relationship between urban air quality and vehicular emissions with existing scenario.

Z-Z-Z

END